United States
Environmental Protection
Agency

Office of
Air and Radiation
Washington, DC 20460

EPA

OMS
Advisory Circular

Subject: EPA MVEL Laboratory Correlation

I. Purpose

The purpose of this advisory circular (A/C) is to describe to motor vehicle manufacturers and motor vehicle manufacturers' associations the EPA MVEL correlation policies that will be used to conduct correlation testing.

II. Background

This circular supercedes A/C No. 52 (January 20, 1976) and defines guidelines for laboratory correlation.

III. Applicability

The provisions of this A/C are applicable to all light-duty vehicle correlation programs which are requested either by manufacturer(s), manufacturers' associations, or by EPA. Under the provisions of §86.088-29(a)(3)(ii) and §600.008-77(g), EPA may reject manufacturer's test data if an unacceptable level of correlation exists between the manufacturer and EPA. Also, current EPA policy places increased emphasis on correlation programs, in that results may be used to determine the number of certification vehicles to receive confirmatory tests by EPA.

IV. Definitions

A. General Correlation Program - As used in this document, a general correlation program is defined as a series of tests at a manufacturer's laboratory and at EPA to establish confidence in test site equivalency and to provide known relationships between EPA and the manufacturer's laboratory. Testing may consist of, but is not limited to: diagnostics, statistical data evaluation, calibration gas analyses, or emission testing.

B. Specific Correlation Program - As used in this document, a specific correlation program is defined as a series of tests at a manufacturer's laboratory and similar tests at EPA using a program plan designed to isolate the cause of specific emission or fuel economy offsets. Testing may consist of, but is not limited to: diagnostics, statistical data evaluation, calibration gas analyses, or emission testing.

C. Manufacturers' Association - A manufacturers' association is defined as a national or international organization which has been recognized by EPA to represent geographic areas or other common interests. Examples of manufacturers' associations include: MVMA (Motor Vehicle Manufacturers Association of the U.S.) and JAMA (Japan Automobile Manufacturers Association).

V. EPA Correlation Program Policies

A. EPA or Manufacturer Requested Programs - To ensure that an acceptable level of correlation exists, general or specific correlation programs may be conducted for the following reasons:

1. Paired data offsets and correlation uncertainty.

2. Changes in testing procedures or equipment.

3. Changes in the emission standards or the regulation of new emission constituents.

B. General Correlation Program - General correlation programs involving EPA will be conducted, unless otherwise agreed upon, using the procedural outline described in Standard Programs (Part VI of this A/C) and the following guidelines:

1. All requests for general correlation programs will be submitted in writing to the Director of the Engineering Operations Division before the start of any tests. Each request should include the following information:

a) Purpose of the program.

b) The manufacturer's laboratories to be involved.

c) A test plan, subject to EPA approval, which includes:
- the number and types of tests.
- the number and types of vehicles.
- the information expected from each type of test.

d) Preferred and acceptable dates of testing at EPA.

2. Because of the inherent efficiency, priority will be given to correlation programs which involve a number of laboratories.

3. Priority will also be given to those programs which use "instrumented" test vehicles. The required instrumentation is specified in Part VI.B.1. of this A/C.

4. Requests for general correlation programs from individual manufacturers not represented in multiple manufacturer correlation activities will also be considered if the rationale and justification why the program is not being requested in coordination with other manufacturers is presented. However, the allocation of EPA laboratory time to any such individual programs must be on an "as available" basis, and sometimes may not be possible. Barring unusual circumstances, it is intended that any general correlation study with an individual manufacturer will be limited to once a year, and two correlation vehicles.

5. As a supplement to all correlation activities, manufacturers may be required to submit data to EPA describing their equipment which includes, but is not limited to: dynamometer, CVS, gas analysis system, air handling, soak area, evaporative emission measurement equipment, particulate measurement equipment, vehicle cooling system (fans), driver's aid, data reduction, data validation, calibration gas, test procedures, fuel analysis, training, and computer programs. Diagnostic data may be requested immediately before and after the correlation program.

6. EPA may determine that other checks may be required to provide information to determine the reasons for an offset, including data on manufacturers' intra-laboratory correlation.

7. When scheduling a correlation program among a number of laboratories, testing at EPA shall be scheduled last before returning to the sponsoring laboratory for final testing. Variations from this policy will be allowed only if it is necessary for improved testing efficiency.

8. Complete vehicle information (i.e., the information requested on the "Vehicle Information Data Sheet," Attachment I) is required at least a week prior to any testing at EPA. Prior to conducting any correlation tests at EPA, all data from similar tests at the manufacturer's laboratories will be submitted to EPA. Final test data must be submitted within ten days of the last test from a correlation program with an individual laboratory. Manufacturers' association final test data shall be submitted to EPA no later than fifteen days from the completion of testing. All data shall be submitted using the "Manufacturer's Laboratory Correlation Data Sheet," Attachment II. All relevant raw data (i.e., sample and background concentrations for test phases, ambient conditions data, CVS data, test site identification, and driver) may be requested in addition to the usual composite test results. In general, data from all participating laboratories will be required prior to the release of any correlation results by EPA.

9. One week of laboratory testing at MVEL is considered an adequate period of time for any participant in a correlation program. It is requested that all single manufacturer correlation tests be executed and concluded as soon as reasonably possible, but always within a one-month period. Manufacturers' associations' general correlation programs are to be completed in a timely fashion, dependent on the number of laboratories included in the program.

C. Specific Correlation Programs

1. Requests for specific correlation programs will be submitted in writing to the Director of the Engineering Operations Division and will be evaluated individually. A specific correlation program may be scheduled as a result of a general correlation program or from an individual request only if:

a. The manufacturers can demonstrate, and EPA agrees, that there is a significant emission or fuel economy offset.

b. The manufacturer has thoroughly investigated the cause of these differences and can find no reason for the correlation problem. The request will include:

1) A list of what was investigated.

2) The reasons these items were investigated.

3) Any data generated.

4) A summary of the results and any conclusions drawn.

c. The manufacturer adequately demonstrates that tests at EPA will be necessary to isolate the cause of the specific correlation problem.

2. EPA may request specific correlation programs when circumstances warrant such a program.

3. Specific correlation programs involving EPA, while tailored from the outline described in Standard Programs (Part VI of this A/C), will be designed to address the manufacturer's specific correlation problem. The guidelines which describe test priority, reporting of supplemental information, submission of intra-laboratory data, data entry forms, and test time allocation are the same as those described in Part B, General Correlation Programs, Sections 3, 5, 6, 8 and 9.

VI. Standard Programs

The events associated with a general correlation program and, if appropriate, specific correlation programs, are shown in Figure 1, the Correlation Flow Chart. This chart is a guideline showing the sequence of events which occur during a typical correlation program. Each correlation program is unique, and therefore certain programs will dictate that EPA be flexible in its adherence to this flowchart. Deviations from this chart will be permitted to enhance the effectiveness and efficiency of a particular correlation program.

A. Testing - The actual test design will vary depending upon the purpose of the general or specific correlation program.

B. Vehicle - Vehicle(s) shall be submitted for testing as follows:

1. Baseline tests must be conducted on the vehicle(s) to establish stabilization before the program begins at the manufacturer's laboratory. The number of baseline tests will be a function of the test repeatability. An assessment of the baseline adequacy will be made by EPA.

2. Because fuel flow measurements and total cumulative torque measurements are valuable diagnostic tools for analyzing correlation anomalies, EPA requests that all vehicles submitted for testing be equipped with a temperature compensated fuel flow measurement system and a totalizing wheel torque measurement system. The fuel flow measurement system shall be capable of providing volumetric or mass fuel flow measurements for individual test phases. The torque measurement system should totalize positive and negative torque separately for each phase of the driving cycle.

3. It is further recommended that all electronic measurement and recording equipment be installed in and remain with the vehicle throughout its test program to minimize measurement discrepancies caused by differences in equipment type, calibration, etc. All equipment is to be designed to operate on 120v, 60HZ AC current, or from the vehicle's power.

C. Analysis - The program evaluation will be based on appropriate statistical analysis to test for the existence of significant differences among test sites and test conditions. The factors of interest include, but are not limited to: test site equipment, time, ambient test conditions, vehicle repeatability, and phase and composite emission and fuel economy values. Other variables will be analyzed where, in EPA's judgment, they are required.

VII. Reports

A report summarizing the results of the general or specific correlation program shall be prepared by the individual manufacturer or the manufacturers' association and submitted to the Director of the Engineering Operations Division. The report should be submitted within four weeks of final testing for an individual manufacturer and within eight weeks of final testing for an association.

EPA will analyze the results of all general and specific correlation programs after all the manufacturer's data are received. When the results of a correlation program warrants an EPA prepared report, one will be prepared and made available to the public. In addition, a copy will be forwarded to the Director of the Certification Division for further action as required.

Office of Mobile Sources

Attachments

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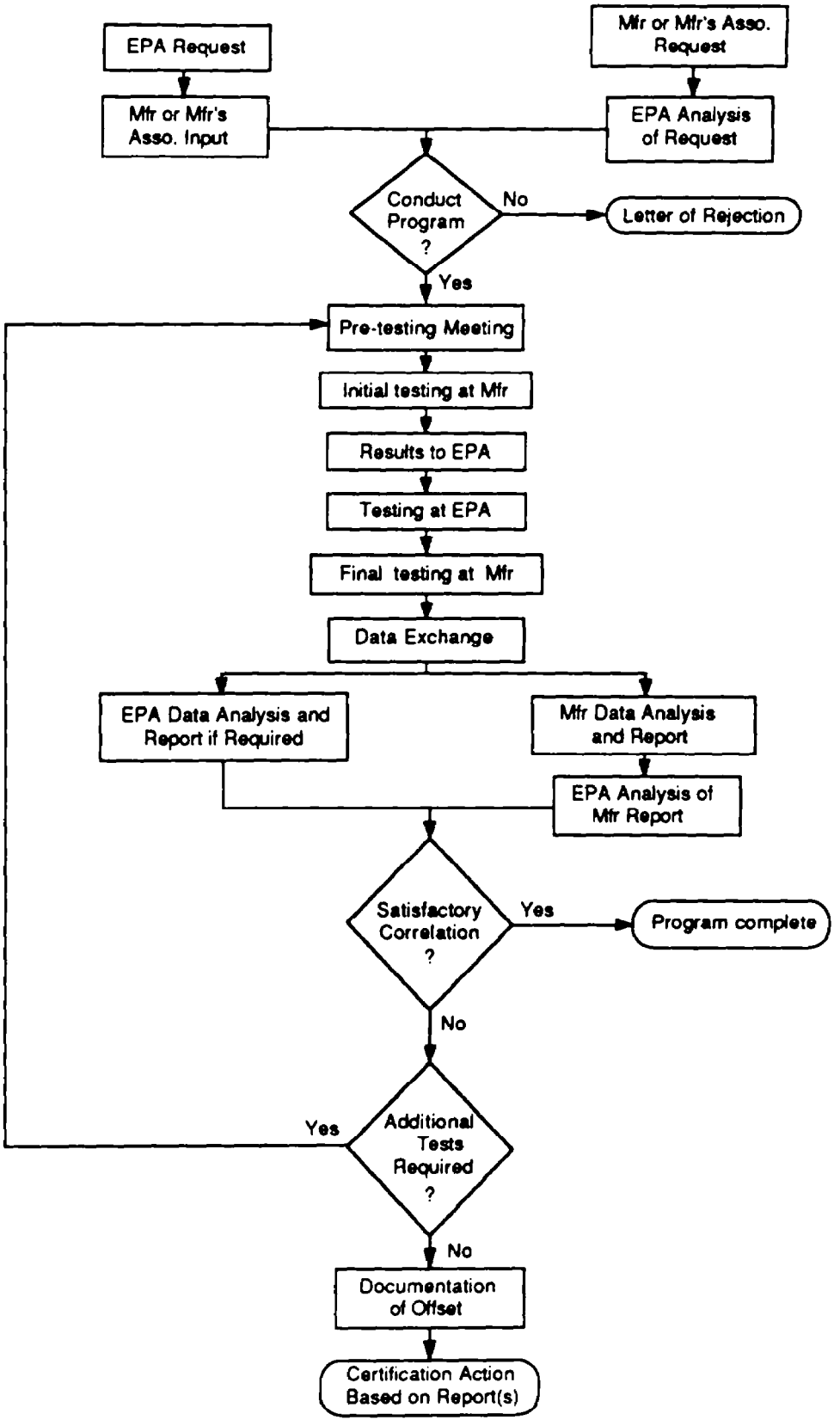
Figure 1

Correlation Flow Chart



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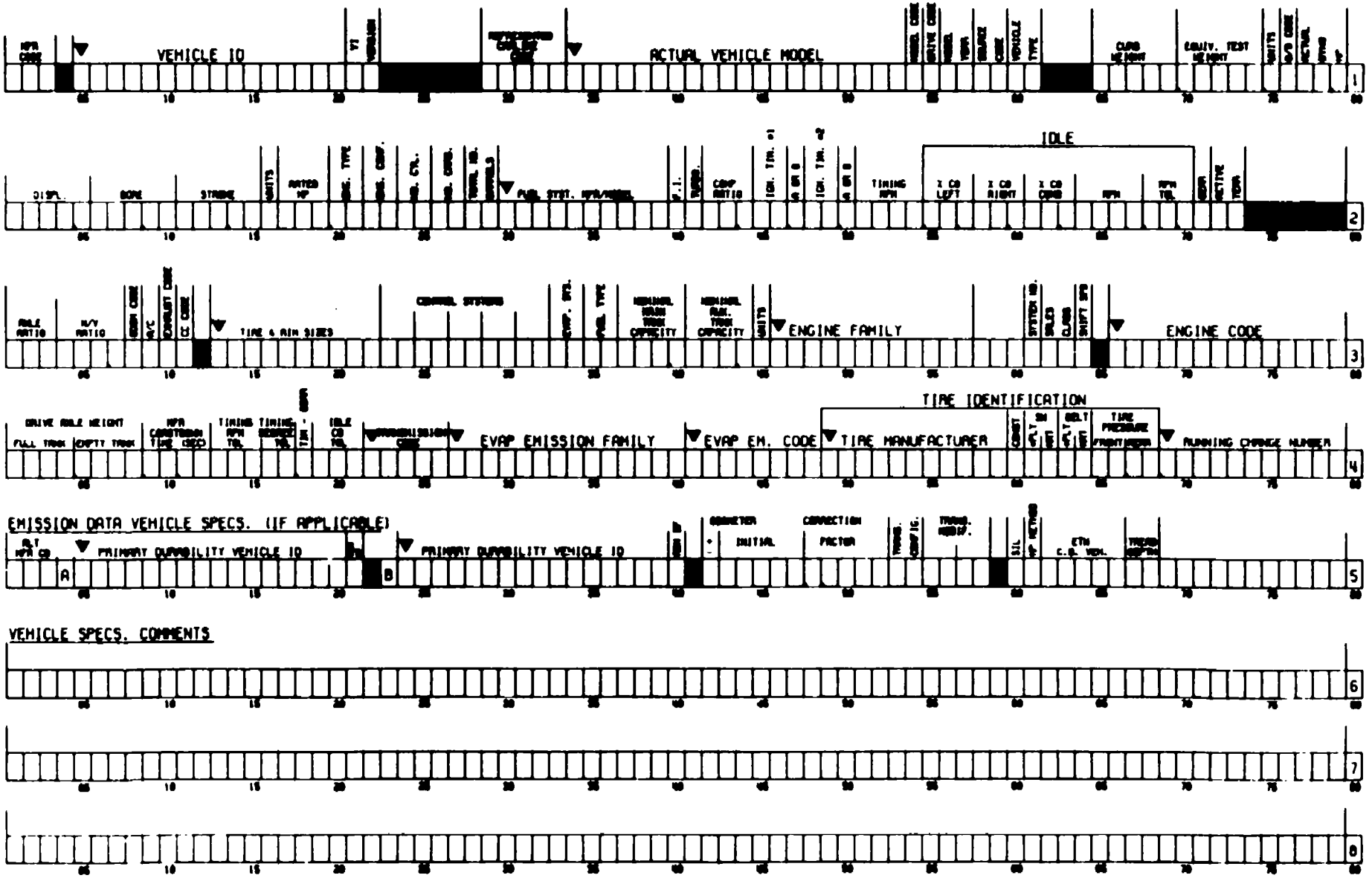
APPLICATION FORMAT
SECTION 12.01.02.00
NEW ___ CORRECTION ___ CHANGE ___ CARRYOVER ___

DATA SUBMITTED BY:_
DIVISION/BRANCH:_

NON - CERTIFICATION

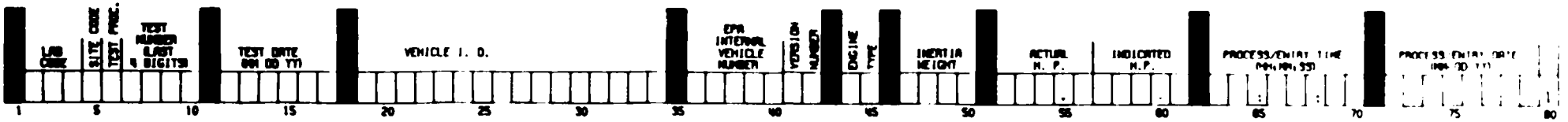
VEHICLE INFORMATION DATA SHEET

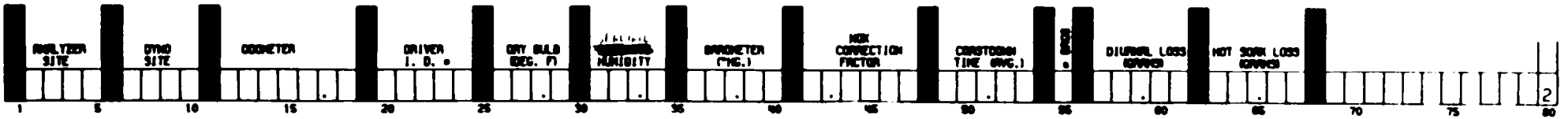
VEHICLE, ENGINE, DRIVE TRAIN & CONTROL SYSTEM SPECS

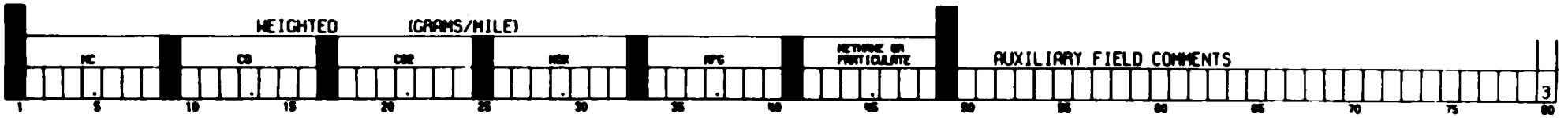


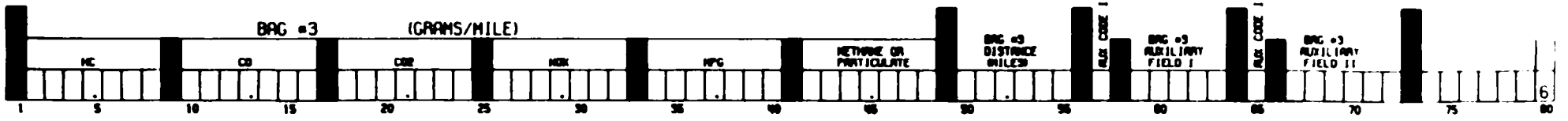
ATTACHMENT II

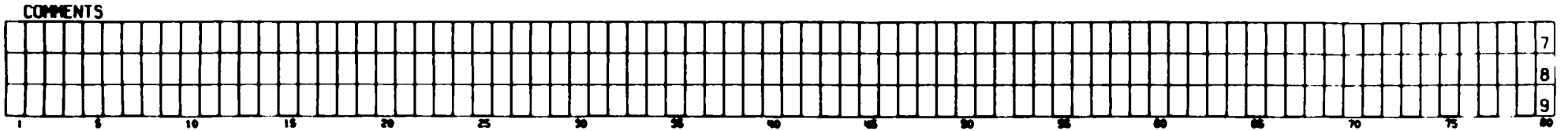
LABORATORY CORRELATION DATA SHEET - MANUFACTURER TEST DATA











D. DEVRIES (5/88)